Some Efforts at FTBF

Selected Short Subjects

Quick Overview

Mostly – Work in Progress

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Overview

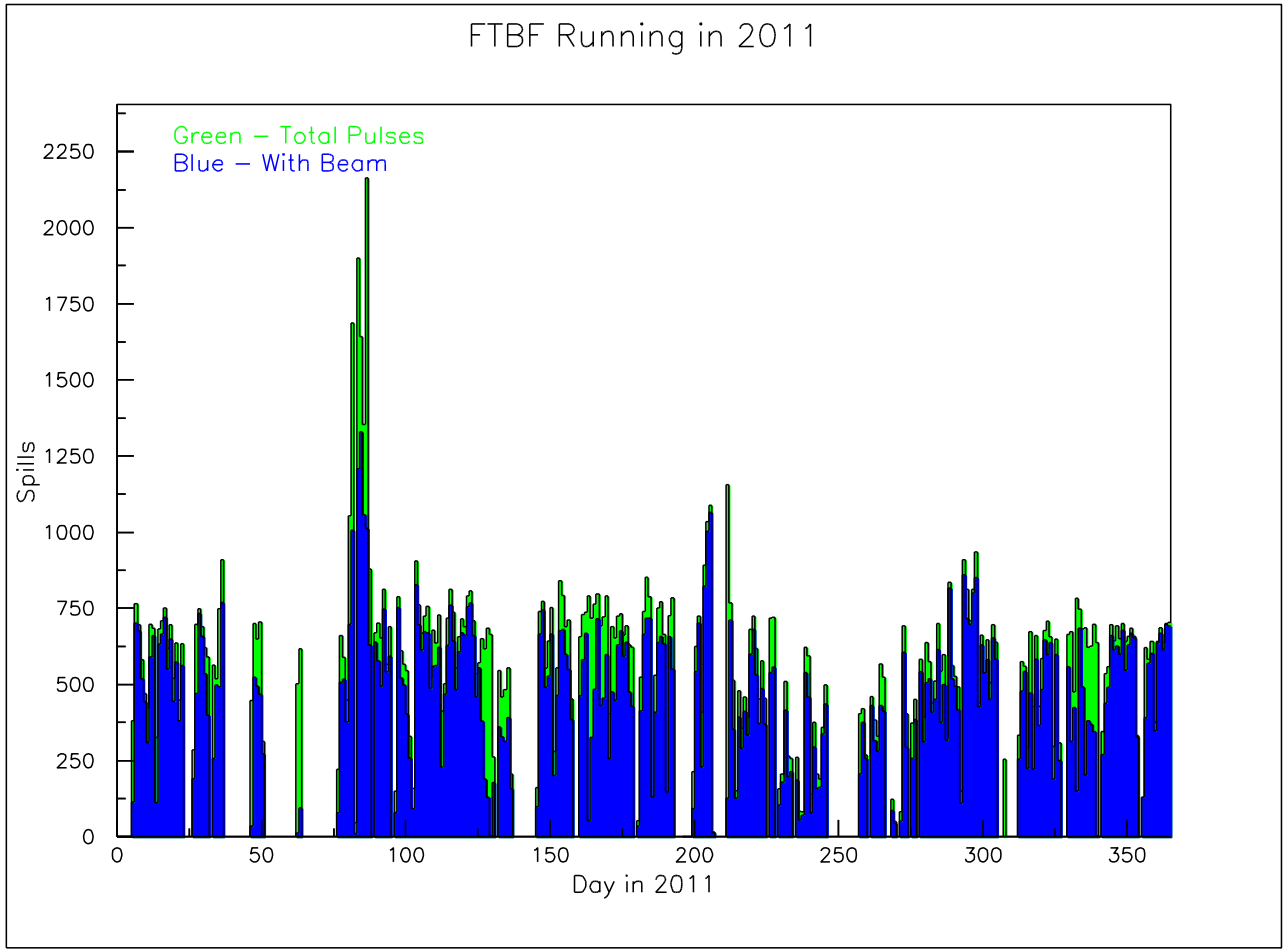
- Running overview of 2011, so far in 2012
- Simulation work in progress
- MCenter plans
- Tertiary Beam comments

Running Modes

- Counting days when beam is delivered is appropriate for FTBF as experimenters have very different rate needs – few 100 / spill to maximum possible (~ 300 K particles / spill)
- Usually – one 4 sec spill each super-cycle (~1 minute) Other possibilities have been developed, but have not been requested by experimenters.
- There may be more than one experiment taking data. (But double no double counting of days here)

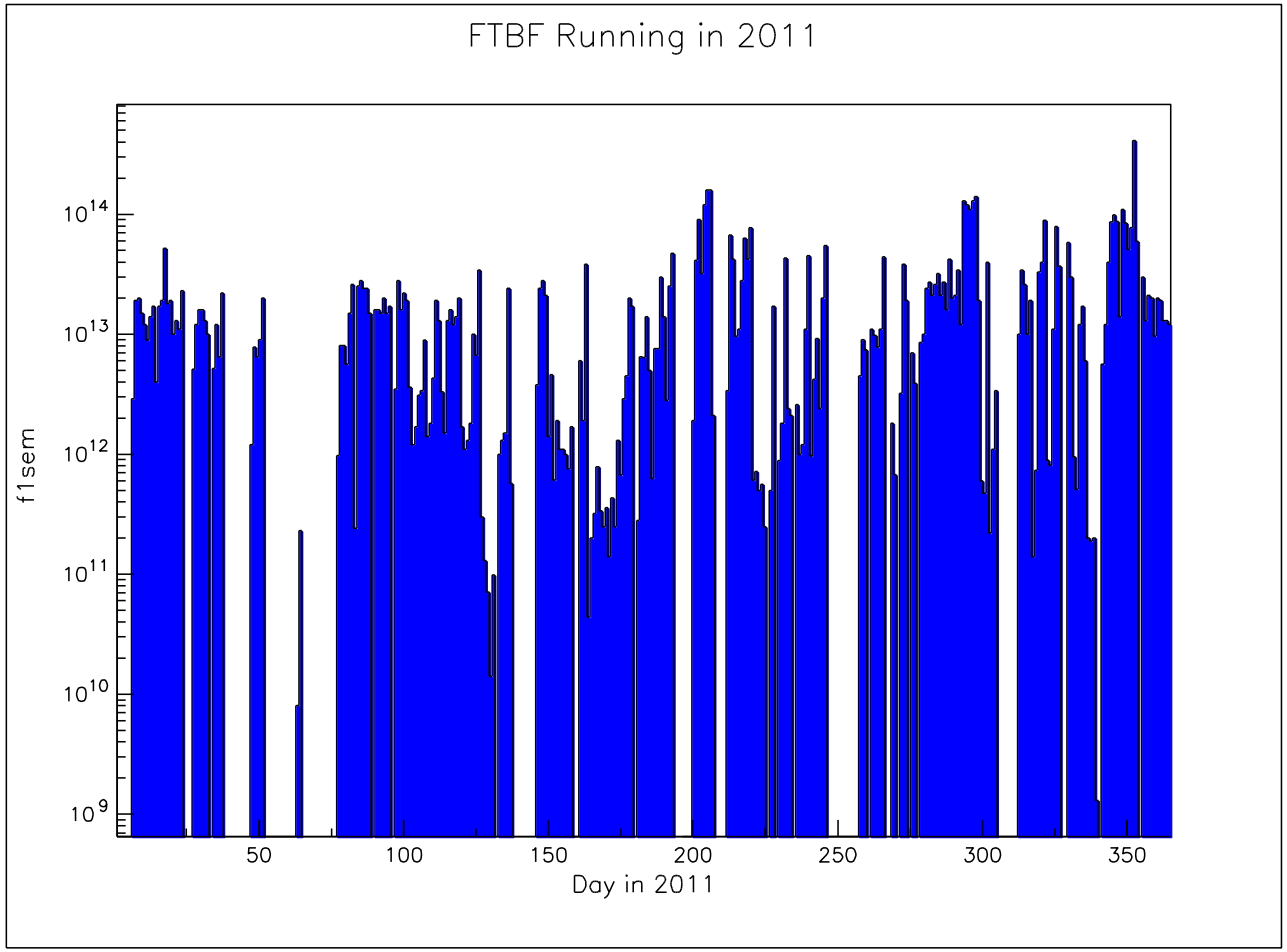
Days of Beam – spills to FTBF

In 2011 there were 270 days when beam was delivered
based on f:mtest, close to f:mt6sc1



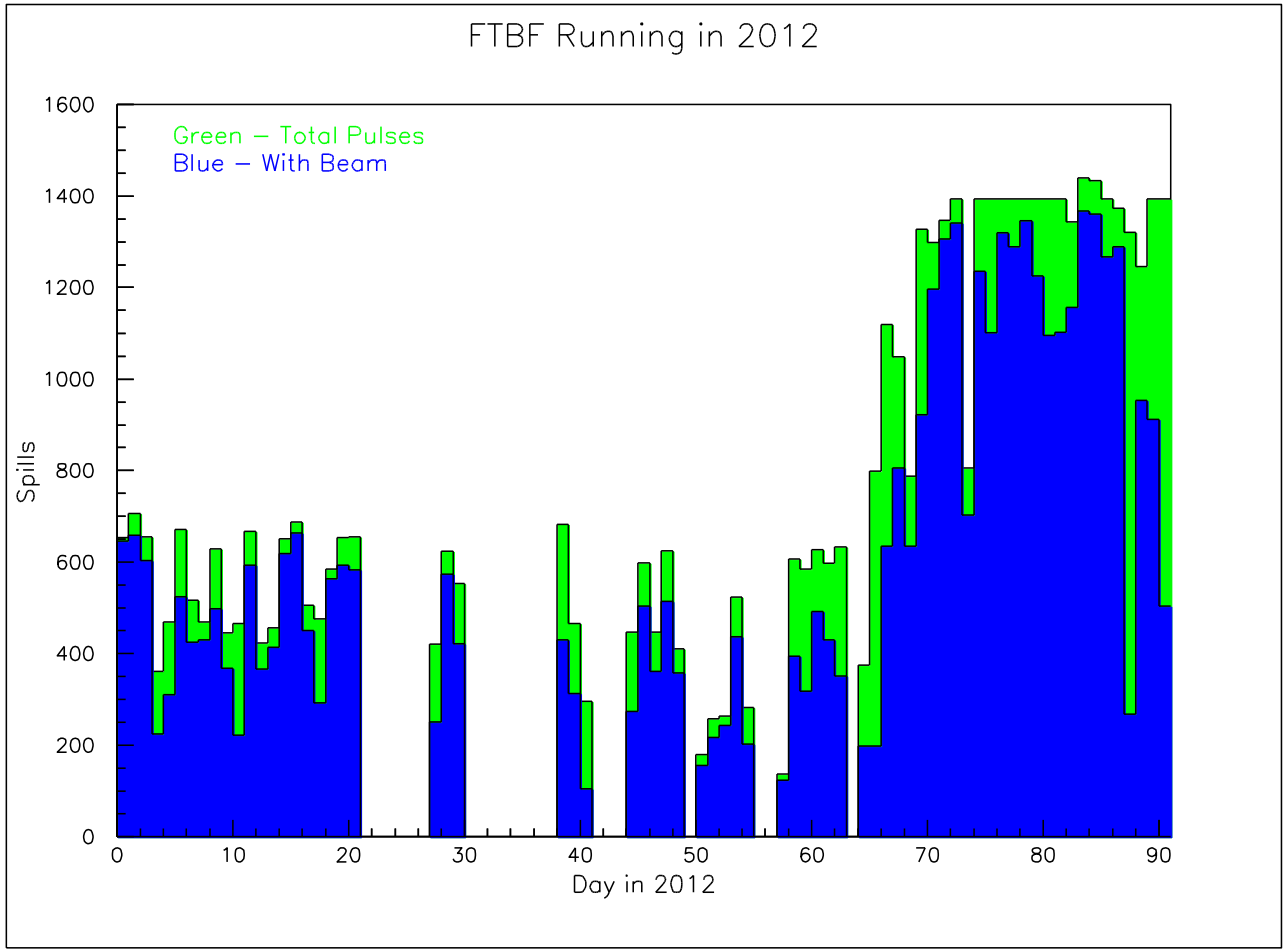
Number of protons sent to FTBF

(f:f1sem)



So Far in 2012

Note: recent running 24 hrs/day with SeaQuest

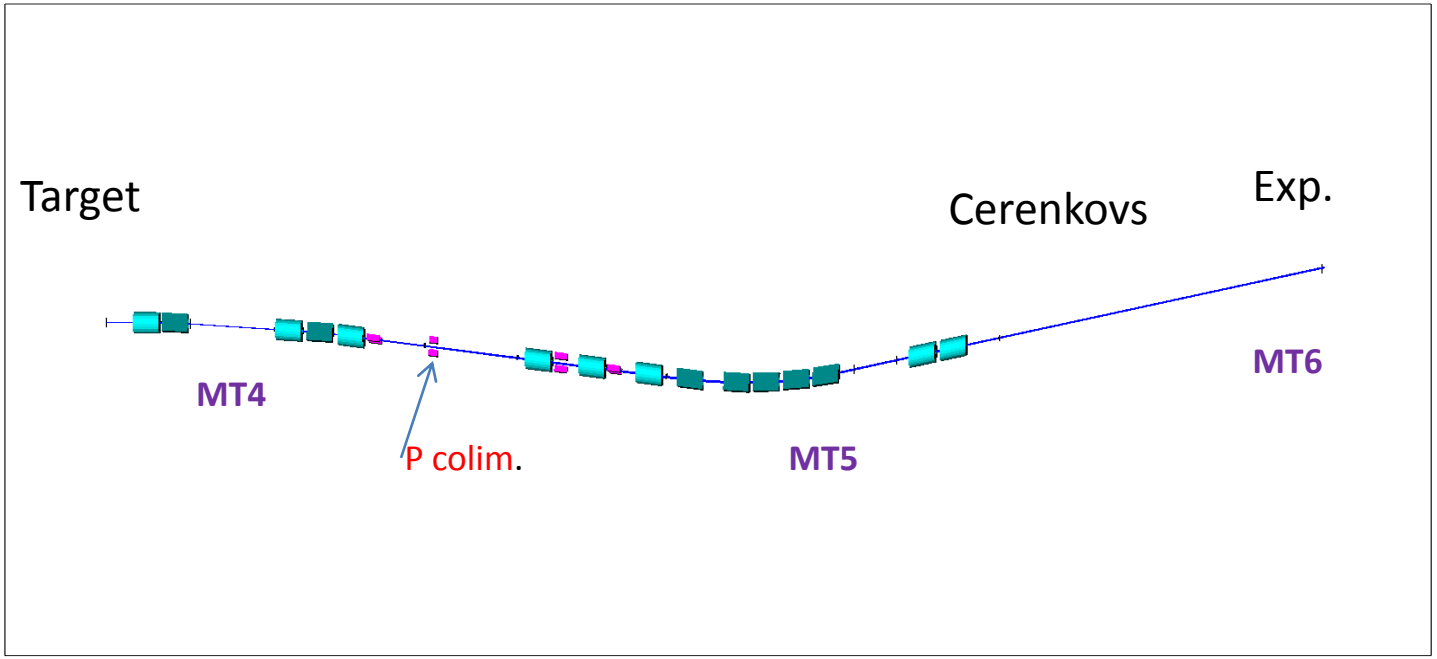


Simulation Efforts on-going

g4beamline and of course transport …

Many useful discussions with **Rick Coleman**

- Explore beam loss, collimation, decays…. Much more to do.
- In the figure below, transverse dims. *10
- **Light green – Quad**, **Dark Green – Dipole**, **Red – collimator**
- Ideal beam – no decays, multiple scattering



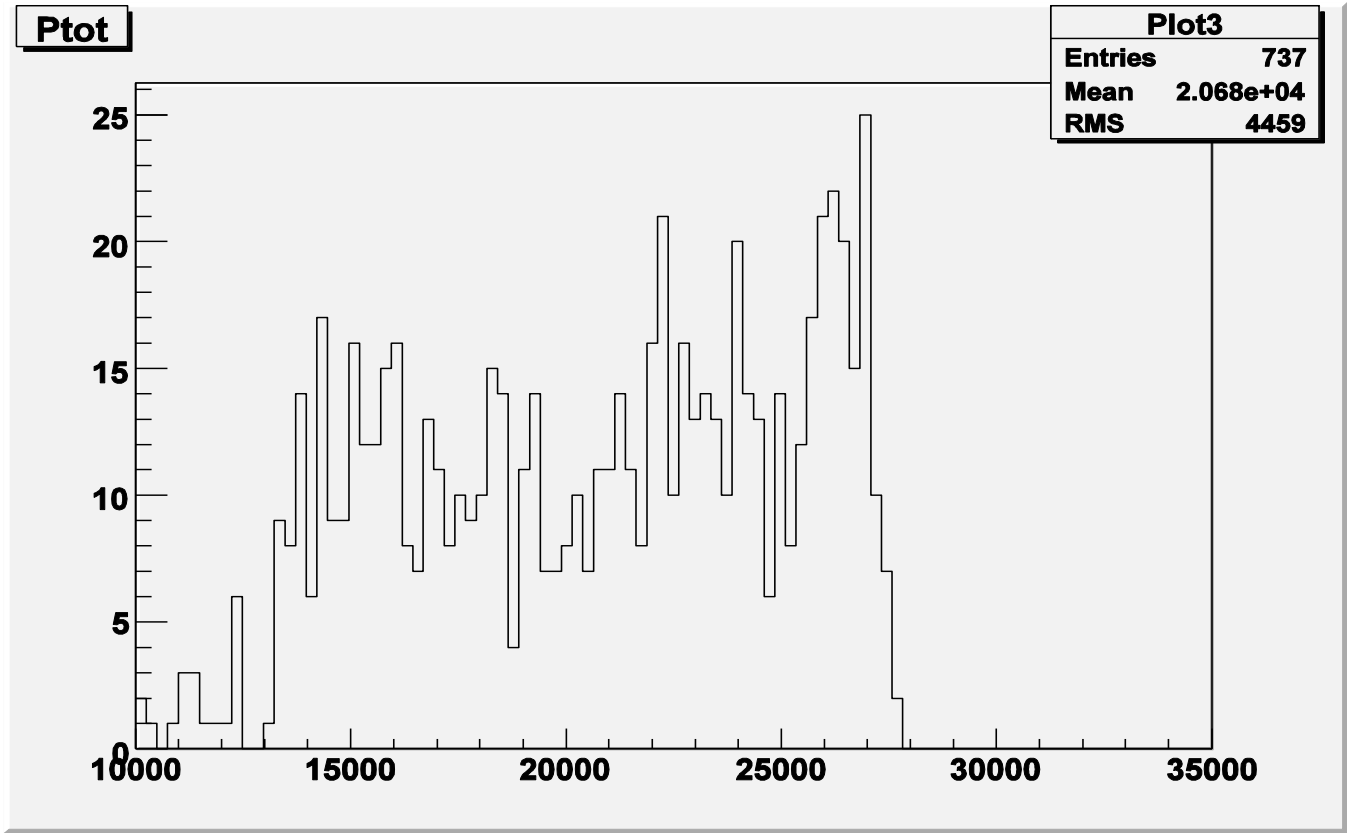
μ^+ 'beam' 737 μ^+ / 20K π^+ = 3.6%

32 GeV/c π beam, ~50 m decay length (final bend to MT6)

The muon beam – **3 m of Fe absorber (μ filter) in the π beam**.

there may be an enhancement at high p – far upstream decays ~60 μ^+

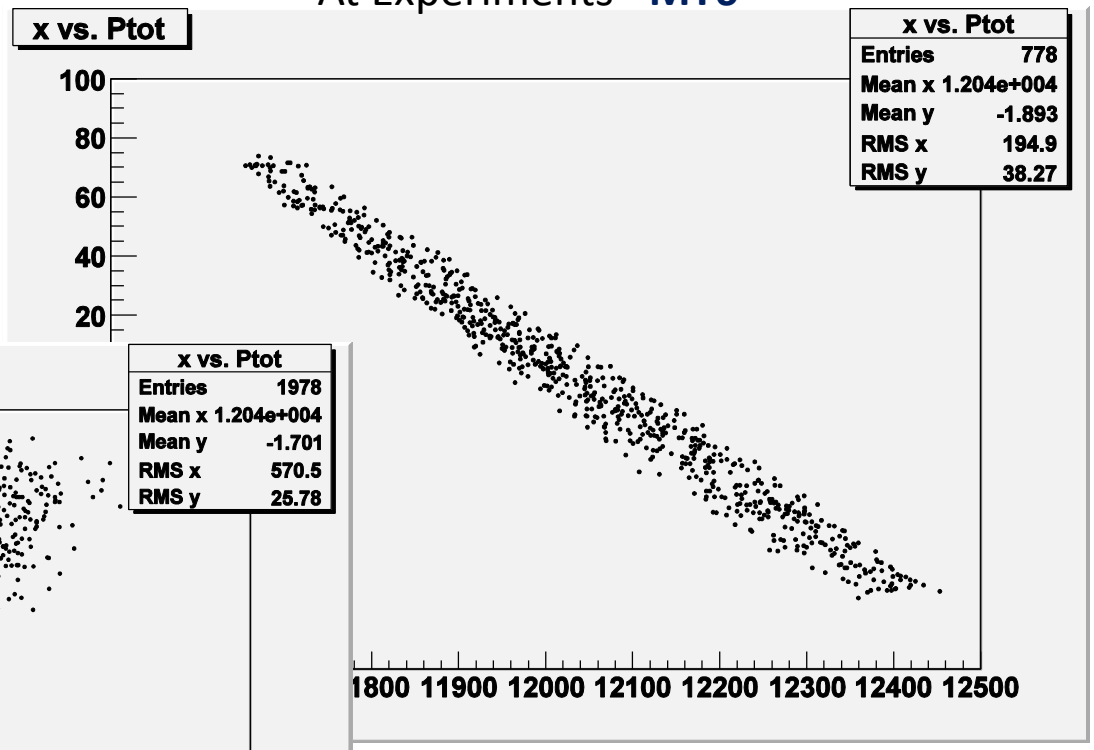
muon rate is about as expected from a simple estimate.



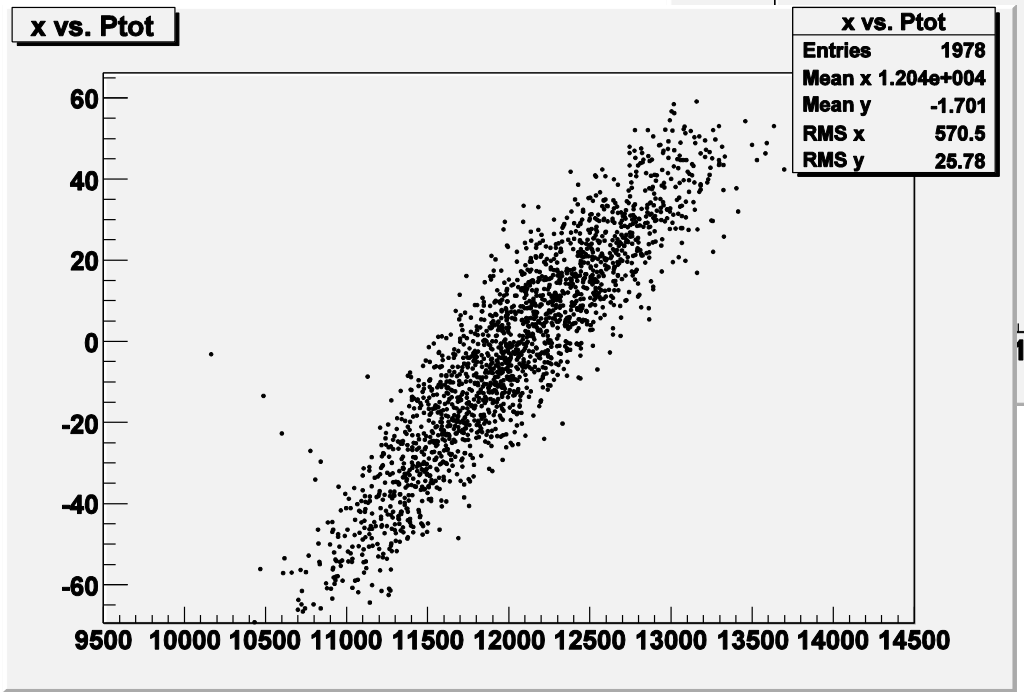
Momentum dispersion

Momentum in MeV/c, nominally 12. x in mm

At Experiments –**MT6**

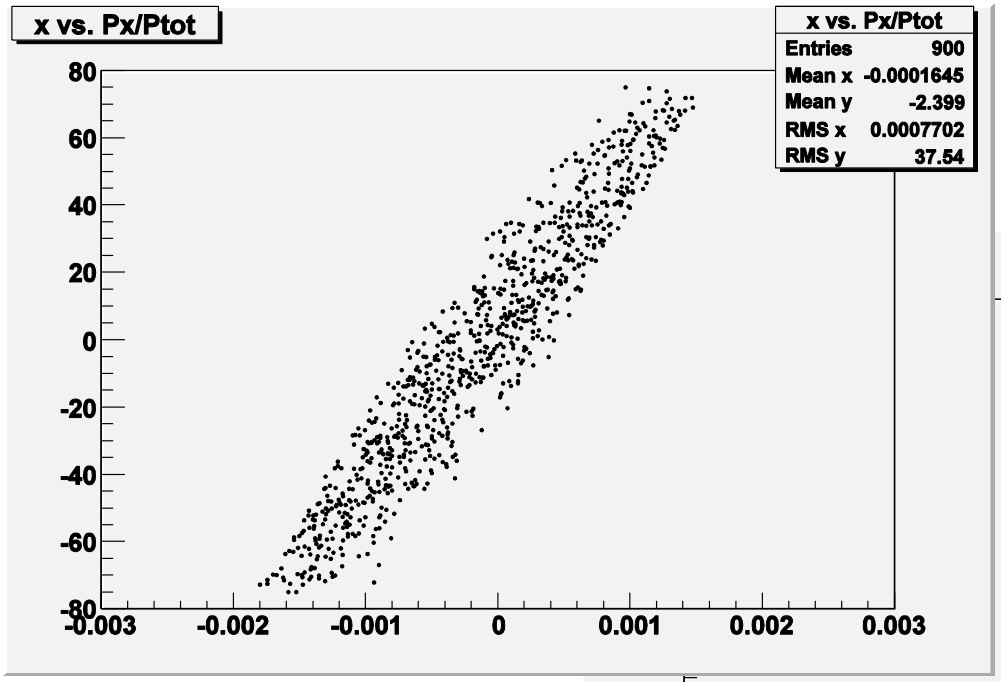


At momentum Collimator

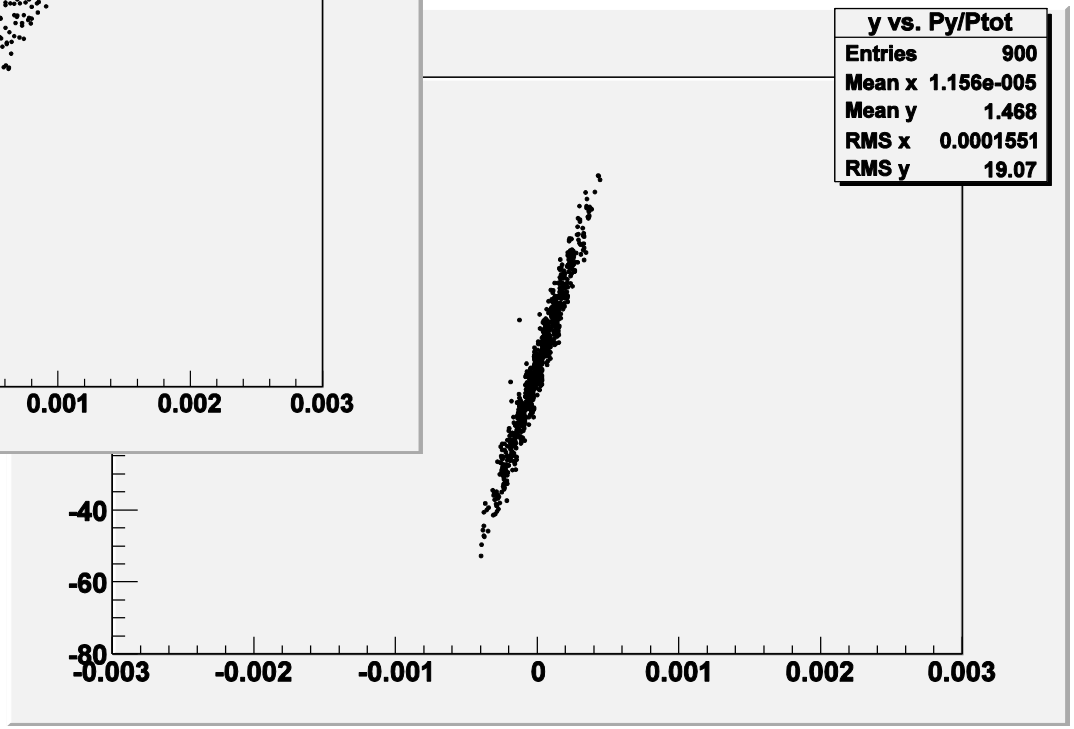


Beam phase space at FTBF

for 16 GeV/c π^+ units are mm, radians

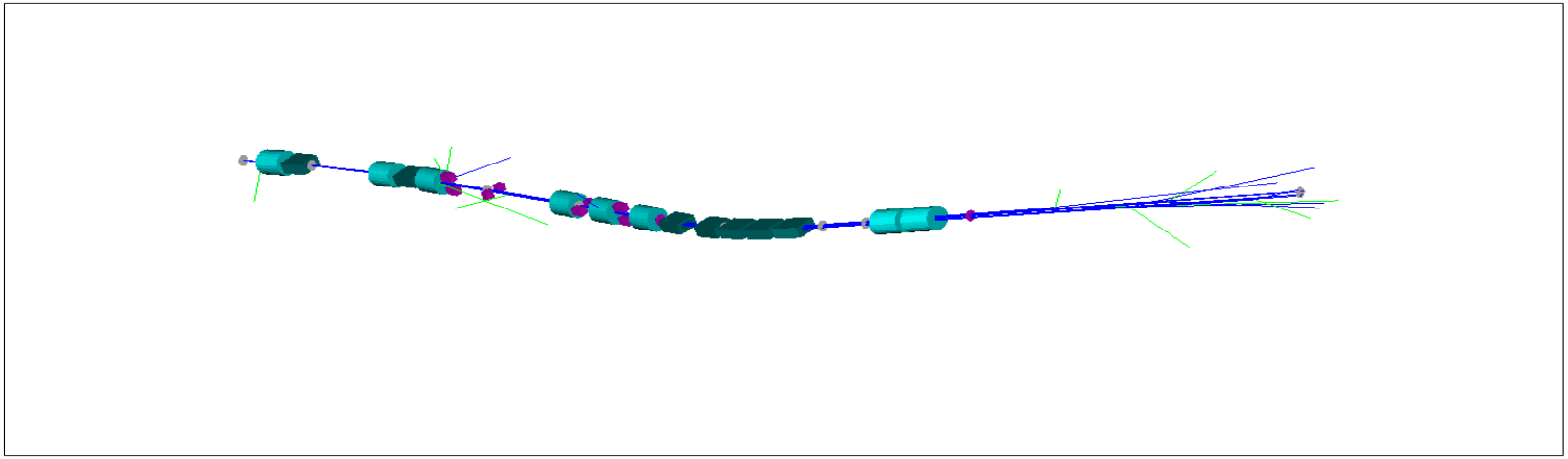


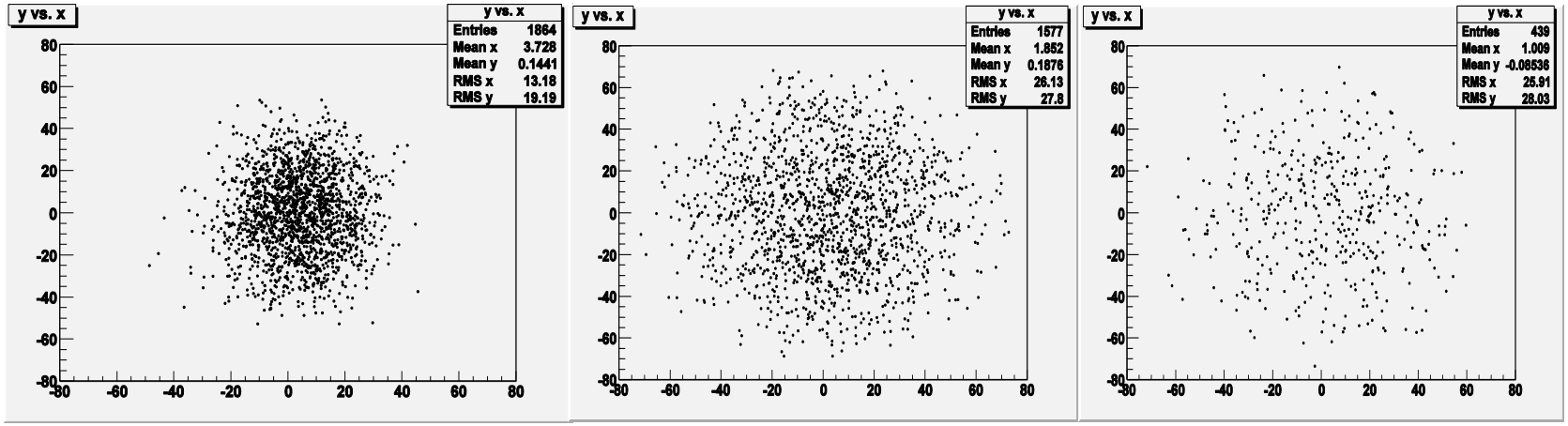
at MT6



Add multiple scattering, π decay

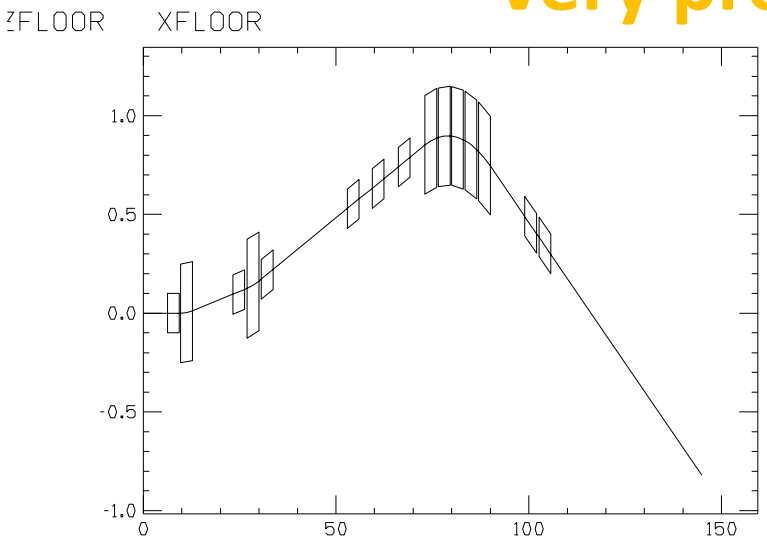
2 GeV/c, Cerenkov counter effects not included

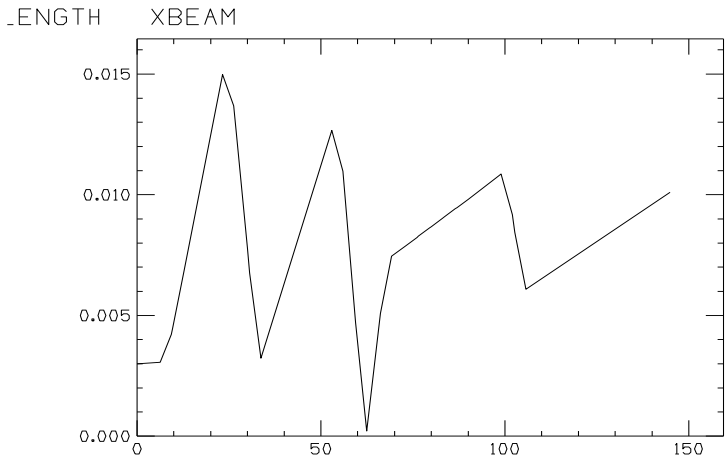


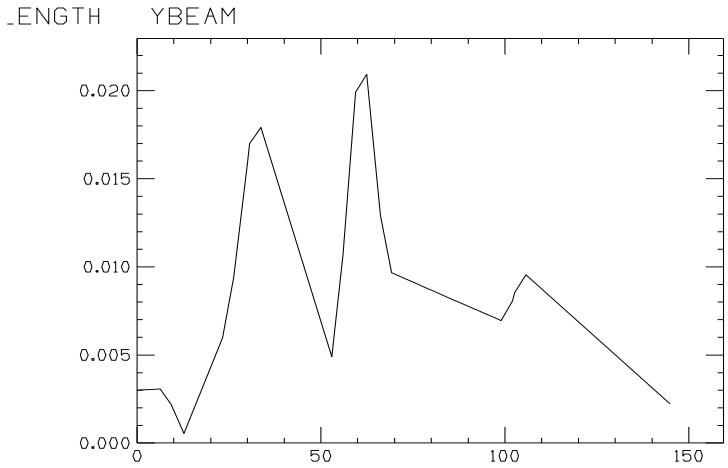


May also use Transport

very preliminary





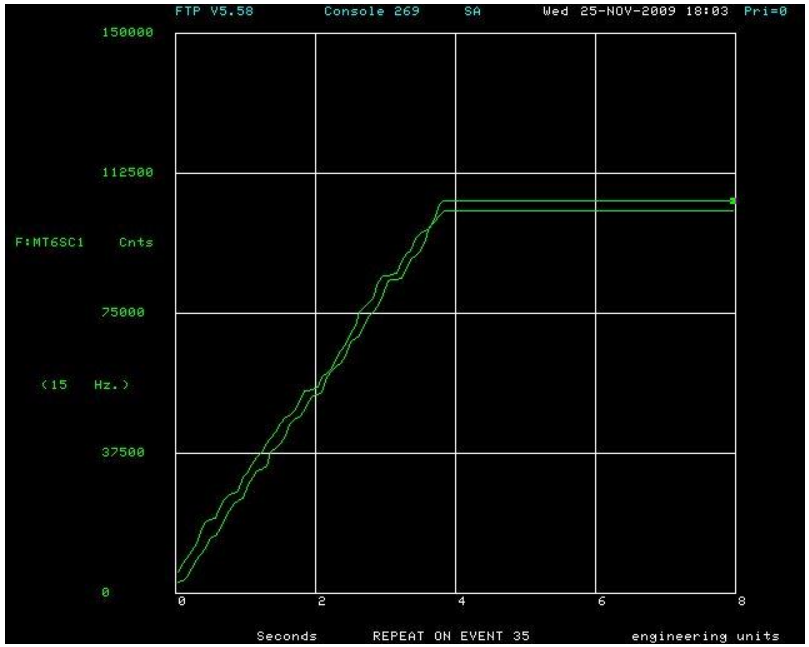


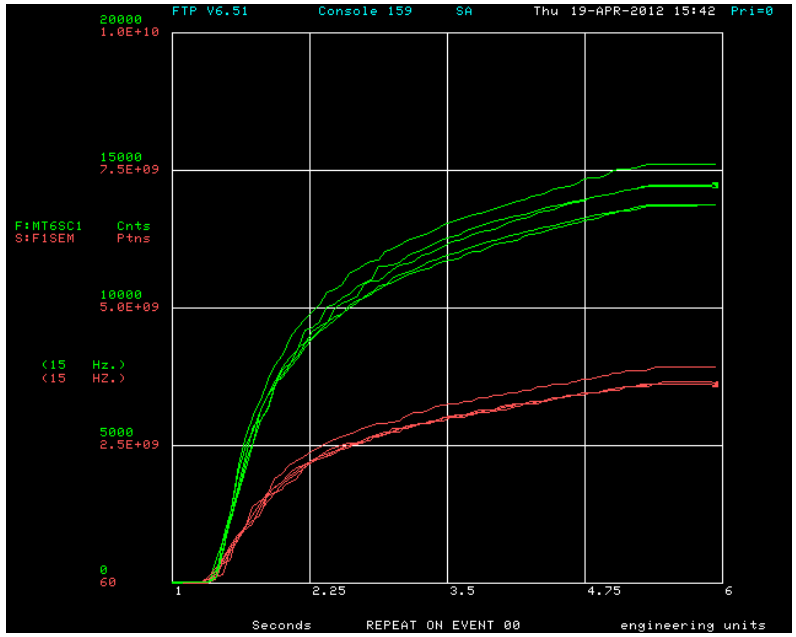
Beam divergence ~ 3 – 4 mr
Cerenkov angles ~ 5 – 10 mr

More tuning needed

Spill structure

Left – Old; Right - Now **Also problems on faster scale ??**





Usual Beam Spill Structure: 4 sec every Minute, 12 hr/day
Other spill structures possible, not requested

Additional Test Beam Space

- The current FTBF facility is heavily utilized.
- Plan to add MCenter as a test beam facility
  - previously the **MIPP** beam line
- 5 – 80 GeV/c + or -, Cerenkov particle ID
- May configure for low intensity protons.
- May extend momentum down to 1 GeV/c
- Technical installation is complete – awaiting final Shielding Assessment – thanks Tom Kobilarcik

MCenter area for experimenters
much work by Todd Nebel et. al.

Upstream end of MC7

Space on the floor

Space on a stand (with
a walkway)

Further downstream

MIPP beam line

JGG

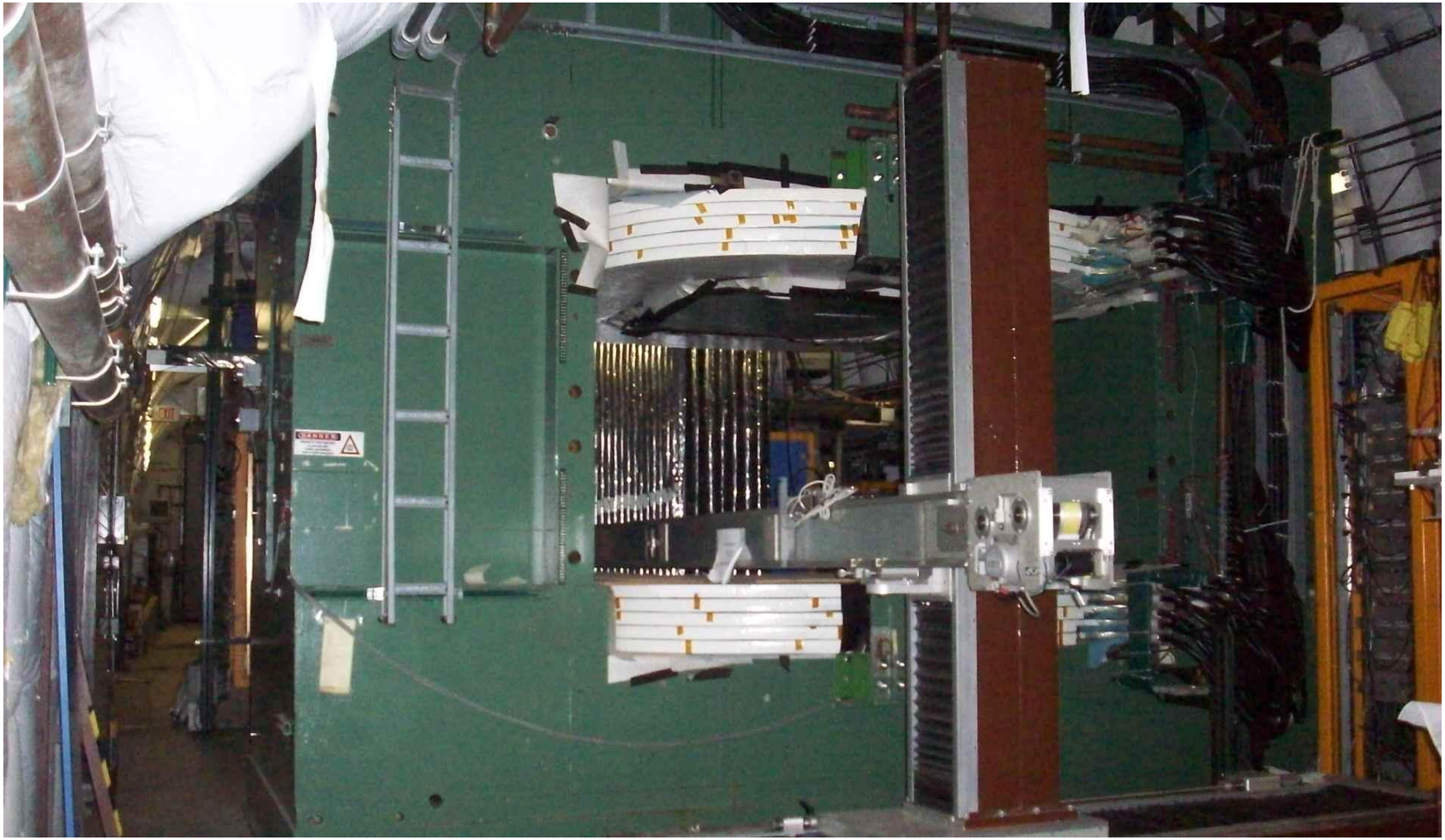
more MIPP

Jolly Green Giant

- Experimenters may have need of a magnetic field in which to study detectors.
- JGG has been refurbished. (longer poles, new coils) – Jim Kilmer …
- Ziptrack has been refurbished
  - (Carl Lindenmeyer, Mike Roman)
  - New optical encoder for ‘z’
  - LabView Software (Jerry Zimmerman)

Refurbished JGG with Ziptrack

much by Jim Kilmer et. al.



EDIT 2012 school Feb 13-24, 2012

Excellence in Detector and Instrumentation Technologies

- Many parts of the Lab were involved
- Erik and Aria put together a nice package at FTBF
- Learn about detectors on 1 day
  - Pmt's, Logic, MWPC, gem, …
- Do a test beam experiment the next !

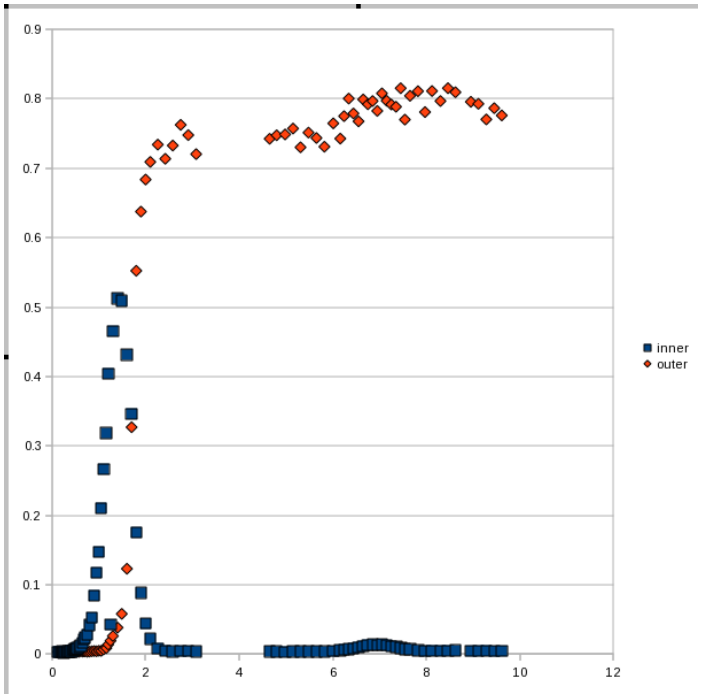
  connect cables, debug logic system

  connect to DAQ, get & look at data

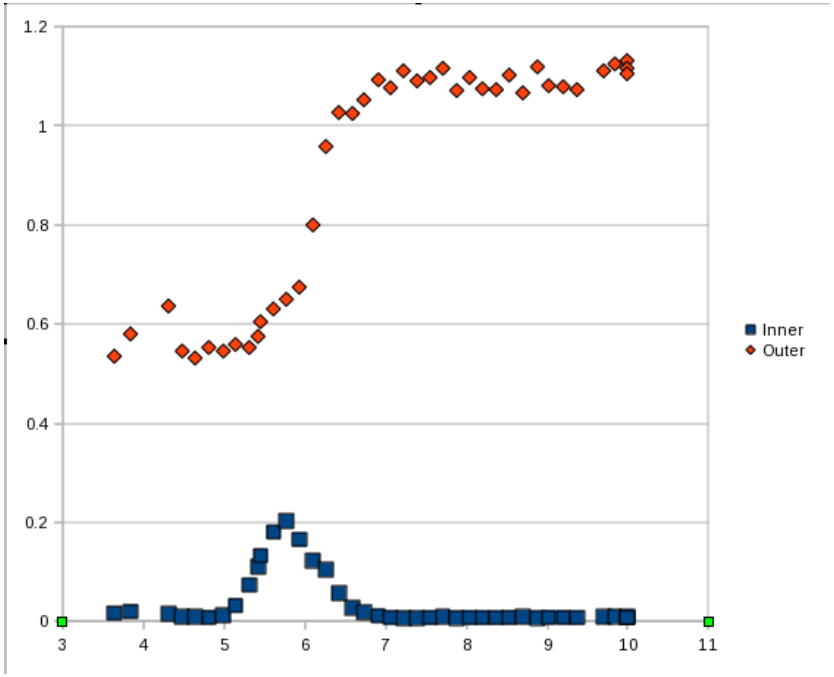
Big hit with the students !

Study differential Cerenkov counter

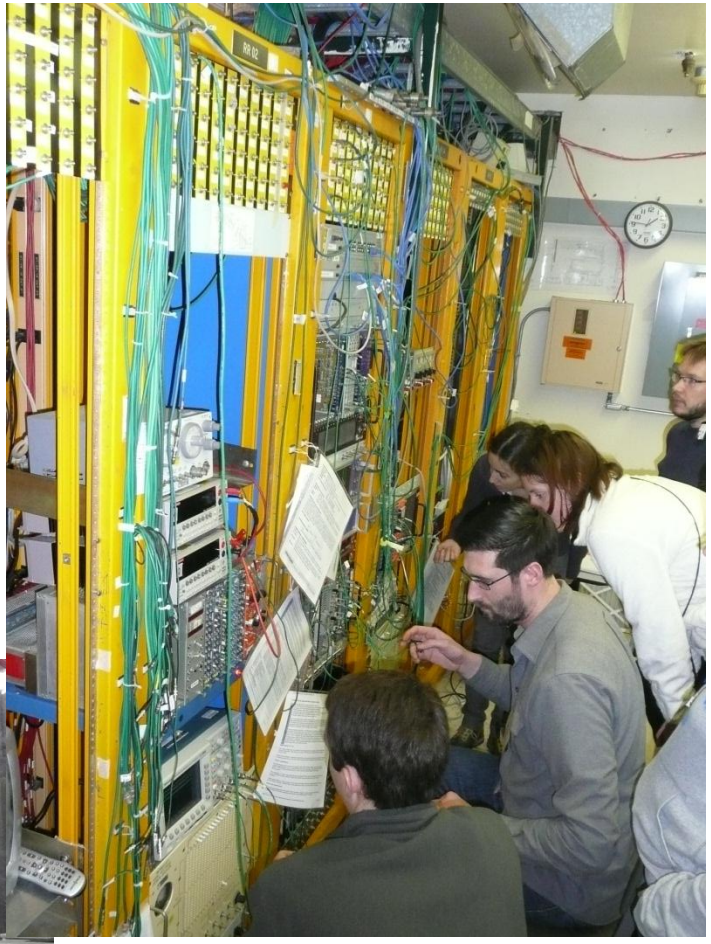
rates in the inner and outer vs pressure



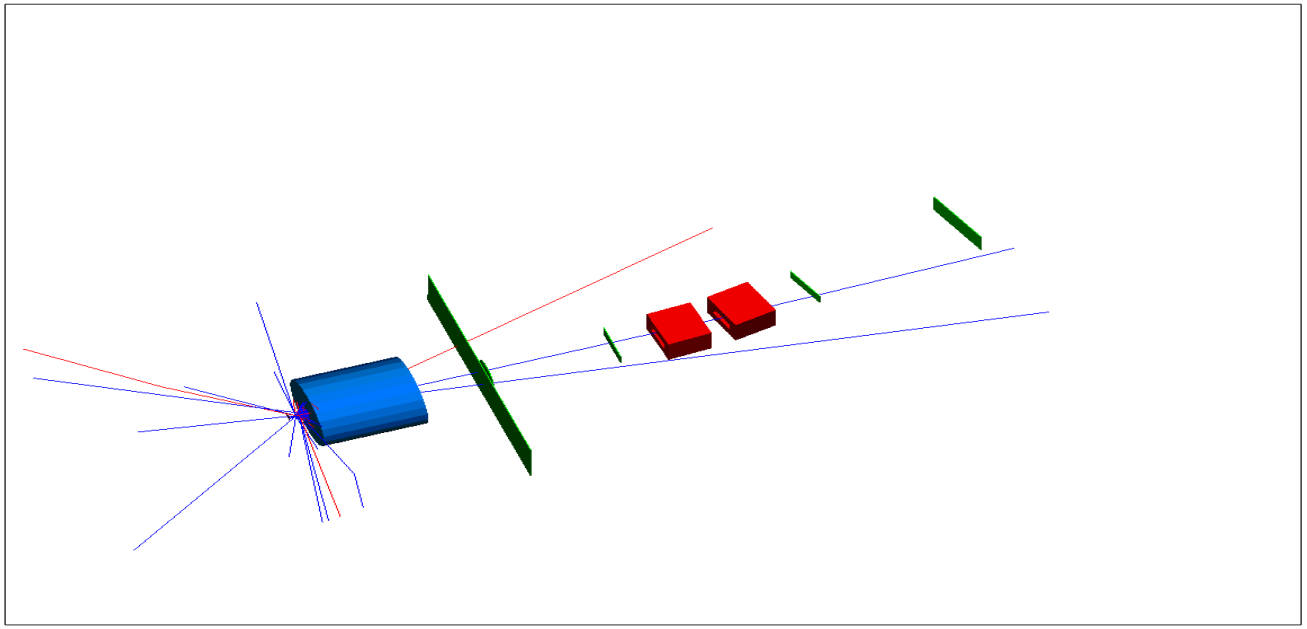
Group 1 Data
positive beam



Group 2 data
negative beam



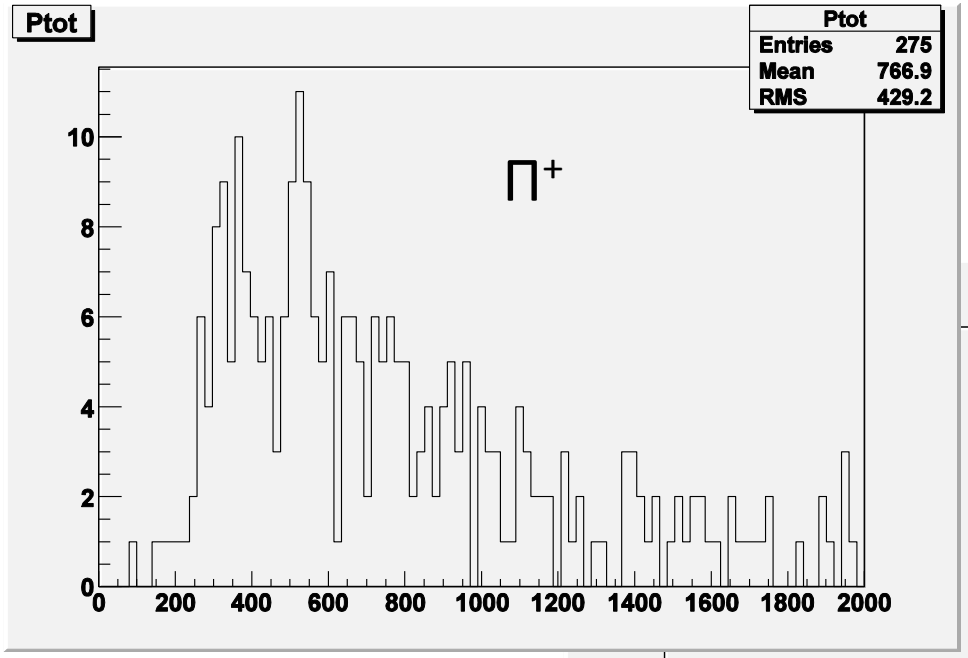
Tertiary Spectrometer



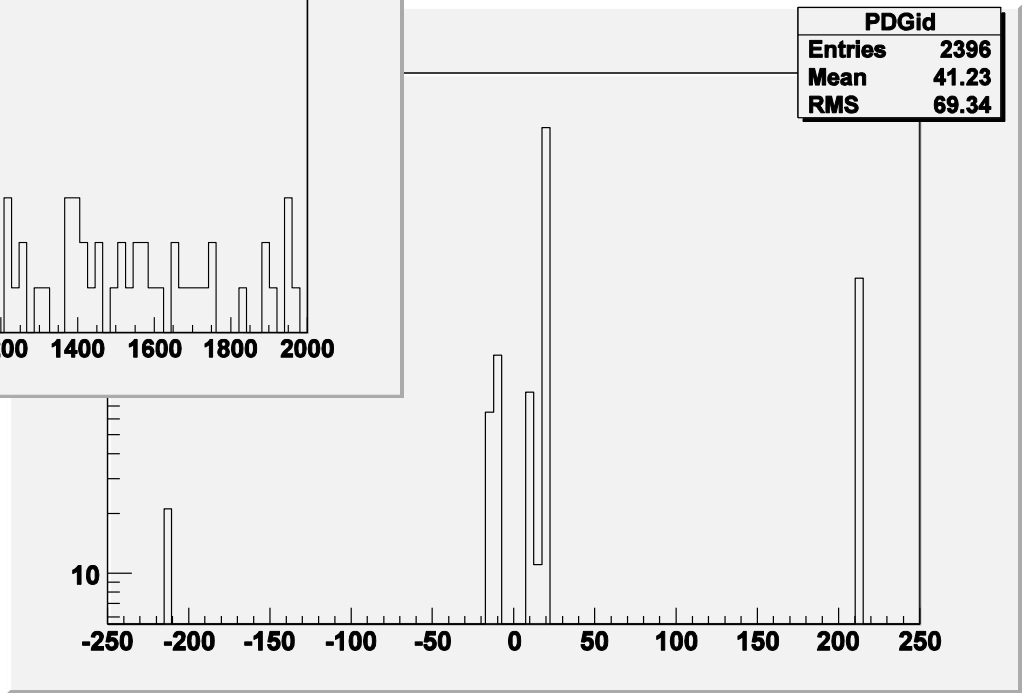
- Used by Minerva (HyperCP chambers)
- Recently – difficulty with CAMAC, Fenker chambers.
- Updating – front end amp (works!), and disc., readout

Tertiary Pion Beam

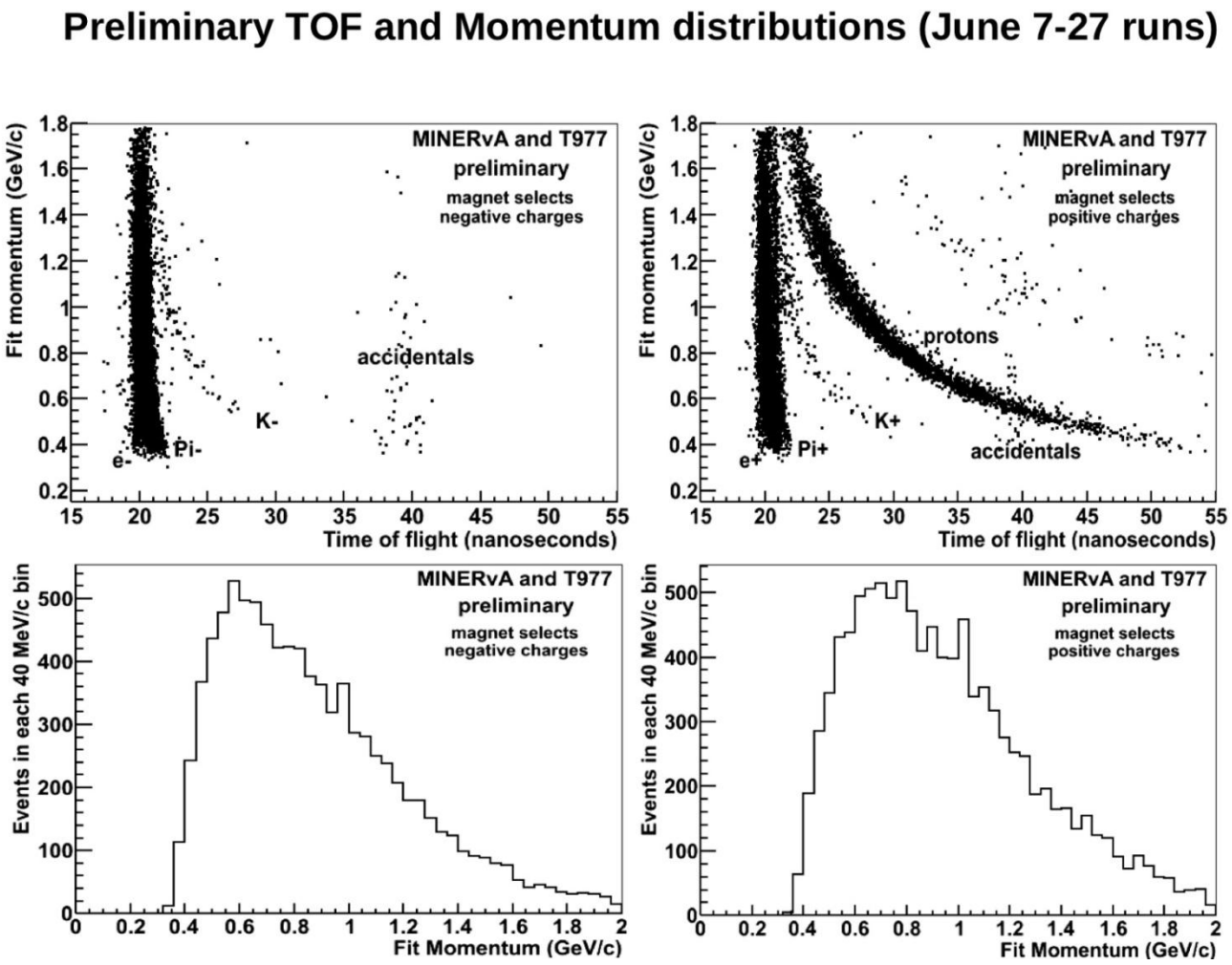
For one incident π^+ beam pulse (300K)



And some protons



Minerva preliminary results



And …

- Planning to do more detailed comparisons of beam and simulations – rates, beam properties, modes
- More detailed Cerenkov studies
- Upgrades of chambers for secondary (FTBF in MWest and MCenter) and tertiary beams.

. . . and . . .

- **Of course – users, users, users !**

Extra

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Overall Layout